

7

Bumper cushions 24 will then absorb the impact of smartphone on surface 32 thereby protecting housing 12 and smartphone 11 from being damaged by the impact of smartphone 11 striking surface 32. In addition to protecting against a drop of smartphone 11 by user 31, shock absorbers 16 may also protect smartphone 11 in the event that user 31 throws smartphone 11 or if some other sudden movement of smartphone 11 for a predetermined time or distance is programmed in controller 9 to trigger deployment of shock absorbers 16.

Referring to FIG. 9, smartphone 11 is shown floating on a liquid surface 34 which may be water. This water could be a lake, ocean, river or other naturally occurring liquid surface or it could be water in a bathtub, commode, sink or other container in a home or other environment. That is, in the event smartphone 11 comes into contact with surface 34, bumper cushions 24, which in one embodiment are made from buoyant material, cause smartphone 11 to float on liquid surface 34. In FIG. 9, shock absorbers 16 are shown in a retracted position as may be the case where accelerometer 13 in smartphone 11 has not detected a triggering event such as a drop from a predetermined distance as described in FIG. 8. If, smartphone 11 was dropped or otherwise propelled onto water surface 34 with sufficient speed, or for a sufficient time, such that a triggering event occurred, then shock absorbers 16 would have been deployed as described above with respect to FIGS. 5, 6 and 8 such that bumper cushions 24 and cover structure 17 would be extended away from corners 19 or housing 12. In this embodiment, only one set of bumper cushions 24 would be in contact with water surface 34. That is, in fully deployed position, bumper cushions 24 would separate away from cover structure 17 such that the 4 bumper cushions 24b (only 2 shown) are in contact with water surface 34 in the embodiment shown in FIG. 9. The upper bumper cushions, designated 24u in FIG. 9 may or may not be in contact with water surface 34 depending upon the buoyancy of bumper cushions 24 and the weight of smartphone 11. In the event that smartphone 11 was positioned on water surface 34 such that screen 14 was facing down, then bumper cushions 24u would be in contact with water surface 34 and bumper cushions 24b may or may not be in contact with water surface 34. In some embodiments, the bumper cushions may extend sufficiently far enough away from the smartphone body on one or both sides that the body does not contact the water or other liquid, presuming the water or other liquid is relatively placid.

Referring to FIG. 10, a flow chart of a method for protecting a smartphone is shown. In step 35, a portable electronic device 11 which may be a smartphone, tablet, media player, laptop computer or other device is held by a user. In step 36 the user inadvertently or otherwise drops or releases the portable electronic device 11. It should be appreciated that these two operations may not form any part of the method for protecting the device, but may instead trigger the various operations of the method, as described below with respect to steps 37 et. seq.

In step 37, an accelerometer 13 in the device senses movement and in step 38, the distance and time of the movement are calculated and compared to a predetermined triggering event by a controller. If the time or distance as calculated in step 38 exceeds the predetermined triggering threshold, then in step 39, an activation signal is sent by controller 9 to a triggering switch 23 or other instrument to deploy shock absorbers 16. In step 41 shock absorbers are moved away from housing 12 and in step 42, the bumper cushions slide away from the cover support. In one embodi-

8

ment, steps 41 and 42 may occur simultaneously or, in another embodiment, step 42 occurs prior or subsequent to step 41.

The foregoing description, for purposes of explanation, used specific nomenclature to provide a thorough understanding of the described embodiments. However, it will be apparent to one skilled in the art that the specific details are not required in order to practice the described embodiments. Thus, the foregoing descriptions of the specific embodiments described herein are presented for purposes of illustration and description. They are not intended to be exhaustive or to limit the embodiments to the precise forms disclosed. It will be apparent to one of ordinary skill in the art that many modifications and variations are possible in view of the above teachings.

What is claimed is:

1. A portable electronic device, comprising:  
a housing;

shock absorbers mounted on supports that slide into and out of the housing, each of the shock absorbers comprising:

a cover structure that forms an edge of the housing and that is mounted to the supports;

additional supports mounted to the cover structure; and a bumper mounted to the additional supports, wherein the additional supports are configured to push the bumper away from cover structure;

a sensor within the housing, the sensor configured to detect movement of the housing;

a controller within the housing, the controller configured to determine a triggering event based upon the detected movement of the housing; and

a switch coupled to the controller for deploying the shock absorbers based upon the triggering event determination.

2. The portable electronic device of claim 1 wherein the bumper is formed of resilient material.

3. The portable electronic device of claim 2 wherein the bumper is buoyant.

4. The portable electronic device of claim 1 wherein the sensor includes an accelerometer.

5. The portable electronic device of claim 1 wherein the controller determines the triggering event by determining a duration of the detected movement.

6. The portable electronic device of claim 1 wherein the supports are rigid.

7. The portable electronic device of claim 1 wherein the supports are spring-loaded and wherein the switch is activated based upon the triggering event determination, wherein the spring-loaded supports slide out of the housing in response to activation of the switch includes spring loaded supports.

8. The portable electronic device of claim 1 wherein the supports are telescoping supports.

9. The portable electronic device of claim 1 wherein the shock absorbers are configured to be retracted back into the housing after deploying.

10. The portable electronic device of claim 1 wherein the controller determines the triggering event by determining a distance of the detected movement.

11. A method for protecting a portable electronic device having a housing and shock absorbers mounted to the housing with retractable supports, the method comprising:  
sensing movement of the portable electronic device;  
comparing the sensed movement to a predetermined threshold; and